

REMARKS

Claims 1 and 3 through 10 are pending in this Application. Claims 1, 3, 7 and 9 have been amended, new claim 10 added. Care has been exercised to avoid the introduction of new matter. Indeed, adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure as, for example, Figs. 1 and 29 and the related discussion thereof in the written description of the specification. Applicants submit that the present Amendment does not generate any new matter issue.

Claims 1 and 3 through 8 were rejected under 35 U.S.C. § 102 for lack of novelty as evidenced by Kim et al.

In the statement of the rejection the Examiner referred primarily to Figs. 2H and 3, asserting the disclosure of a semiconductor device corresponding to that claimed, noting first and second trenches filled with first and second insulation insulating films 124, gate insulating film 102 having a bird's beak, silicon film 104 formed on the gate insulating film and conductive film 126 formed on silicon film 104. This rejection is traversed.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the identical disclosure in a single reference of each element of a claimed invention, such that the identically claimed invention is placed into the recognized possession of one having ordinary skill in the art. *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 66 USPQ2d 1801 (Fed. Cir. 2003); *Crown Operations International Ltd. v. Solutia Inc.*, 289 F.3d 1367, 62 USPQ2d 1917 (Fed. Cir. 2002). There is a significant difference between the claimed semiconductor device and the semiconductor device disclosed by Kim et al. that scotches the factual determination that Kim et al. disclose a semiconductor device identically corresponding to that claimed.

Specifically, the semiconductor device defined in claim 1 comprises a silicon film (Element 4 in Fig. 1) having a thickness exceeding 0 and less than 50 nm. Kim et al. do not disclose a semiconductor device having a corresponding silicon film identically corresponding to that claimed. Rather, the silicon film 103 disclosed by Kim et al. has a thickness between 20 nm and 150 nm, e.g., 50 nm. These ranges are not identical, i.e., they do not coincide. Accordingly, the rejection under 35 U.S.C. § 102 for lack of novelty cannot stand, because 35 U.S.C. § 102 requires that the claimed invention be **identically** disclosed in the prior art. *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 230 USPQ 81 (Fed. Cir. 1986). Accordingly, the imposed rejection under 35 U.S.C. § 102 is not factually viable.

Applicants recognize that the Examiner may resort to an obviousness rejection under 35 U.S.C. § 103. However, Applicants would argue that the claimed invention is free of 35 U.S.C. § 103 vis-à-vis the reference to Kim et al., because the thickness limitation of the silicon film of the semiconductor device defined in claim 1 is functionally significant, i.e., critical. Applicants would encourage the Examiner to consider the **evidence in the specification** which demonstrates the criticality of the thickness limitation of the silicon film of the semiconductor device defined in claim 1. Such evidence, of course, must be given consideration in resolving the patentability of the claimed invention. *In re Soni*, 54 F.3d 746, 34 USPQ2d 1685 (Fed. Cir. 1995); *In re Margolis*, 785 F.2d 1029, 228 USPQ 940 (Fed. Cir. 1986).

Specifically, as disclosed at page 3 of the written description of the specification, lines 12 through 15, an object of the present invention is to provide a semiconductor device wherein the bird's beaks having desired dimensions are formed in a gate insulating film and the gate insulating film exhibits excellent electrical characteristics. In order to achieve this objective,

claim 1 defines the thickness of the silicon film formed on a gate insulating film to exceed 0 and to be less than 50 nm. By gradually increasing the thickness of the silicon film from a value exceeding 0, the dimensions of the bird's beak can be increased. However, the dimensions of the bird's beaks cannot be increased by increasing the thickness of the silicon film to a value of 50 nm or greater. This is because if the thickness of the silicon film is set at a value of 50 nm or greater, short-circuiting may result between conductive films containing silicon, in the direction perpendicular to the direction along which the first and second trenches are aligned. The Examiner's attention is invited to page 9 of the written description of the specification, line 22 through page 10, line 5.

The functional significance or criticality of the thickness limitations of the silicon film as set forth in claim 1 is also demonstrated in the disclosed embodiment relating to Figs. 18 through 23. Figs. 21, 22 and 23 illustrate bird's beak portions 30 wherein the thickness of amorphous silicon film 36, corresponding to the silicon film of claim 1, is changed. Adverting to Fig. 22 wherein the thickness of amorphous film 36 is 50 nm, the angle formed in a portion formed to be a bird's beak shape in bird's beak portions 30 is greater than in Fig. 21, wherein the thickness of amorphous silicon film 36 is 30 nm. On the other hand, referring to Fig. 23, wherein the thickness of amorphous silicon film 36 is 70 nm, the angle formed in a portion formed to be a bird's beak shape in bird's beak portions 30 does not greatly differ from that in Fig. 22, wherein the thickness of amorphous silicon film 36 is 50 nm.

In contradistinction to the present invention, according to Kim et al., a silicon film 103 has a thickness of about 20 nm to 150 nm, preferably 50 nm, as disclosed in column 5, line 54. Again, the thickness range disclosed by Kim et al. for the silicon film is different from that of the

claimed invention. Indeed, if the silicon film was formed at a thickness of 50 nm, which is preferred by Kim et al., the objective of the present invention could not be obtained.

Based upon the foregoing it should be apparent that the imposed rejection of claims 1 and 3 through 8 under 35 U.S.C. § 102 for lack of novelty as evidenced by Kim et al. is not factually viable and, hence, should be withdrawn. Moreover, for reasons argued above, Kim et al. would not have rendered the claimed subject matter as a whole obvious within the meaning of 35 U.S.C. § 103.

New claim 10.

New claim 10 is free of the applied prior art by virtue of its dependence upon independent claim 1, the patentability of which has been argued *supra*. Moreover, Applicants separately argue the patentability of claim 10 based upon the limitations expressed therein. The claimed structure containing, *inter alia*, shoulder portions, is not disclosed or suggested by Kim et al.

Applicants acknowledge, with appreciation, the Examiner's allowance of claim 9. Based upon the arguments submitted *supra*, Applicants submit that the imposed rejection has been overcome, and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, solicited.


To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

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including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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